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COVER: Navy flight nurse LTJG Bobbi Hovis, NC, USN (right) and an Air Force colleague oversee loading of a Korean War casualty aboard a Military Air Transport Service aircraft of the 1453rd Medical Air Evacuation Squadron. Story on page 18.

Navy Chaplain Corps Launches High-Tech Ministry

CAPT Jane F. Vieira, CHC, USN

ChaplainCare is a new Fleet focused interactive and informational website recently launched by the Navy Chaplain Corps. In keeping with Navy medicine's focus on health as "a state of physical, mental, spiritual, and social well being," ChaplainCare promotes spiritual and emotional health as a key to total health and readiness with a goal of delivering customer-service "second to none."

As part of the Navy's Distance Support initiative, ChaplainCare provides round-the-clock access to religious information and chaplain support any time, anywhere via an interactive website accessed at: **www.ChaplainCare.navy.mil**, a specially developed CD for afloat units, and the Navy's Integrated Call Center (1-877-41-TOUCH or OCONUS DSN: 510-42-TOUCH). You can also link to ChaplainCare on Navy medicine's homepage. Designed to help Sailors, Marines, and Coast Guard personnel in isolated locations find help online, ChaplainCare seeks to link service members with the "right information, the right support, or the right person" in a timely manner.

ChaplainCare is both interactive and informational. The interactive component allows you to ask a question or request information via a pre-addressed email address to **ChaplainCare@chaplain.navy.mil** and receive a response within 24 hours. Or, in the case of a pastoral need, you can request to speak with a chaplain on-call via the Navy's Integrated Call Center, manned by a capable team of retired master chiefs round-the-clock. These trained professionals ensure the caller receives the support or information requested and track the request until it is resolved. Extraordinarily customer-focused, their philosophy is "your problem is my problem until it is solved." Every request is assigned a tracking number, and all requests are considered open until appropriately referred or resolved.

The site also contains a wealth of religious information, spiritual resources, and links to all kinds of support for spiritual and emotional wellness. Included is a personal prayer section designed to address various feeling states and life occasions. If you need a prayer for when you've had a hard day at work, when you feel unimportant, under stress, or in need of encouragement, you can access a prayer specifically written to provide perspective, encouragement, comfort, etc. There are also links to 18 Daily Devotions from a variety of faith traditions (including one in Spanish) and over 120 devotions written by Navy chaplains providing spiritual perspective and highlighting values.

An "About Various Faiths" section includes a synopsis of 22 religions and links to over 400 other faith groups from Amish to Zoroastrianism. Because many young service members are looking toward marriage, a wedding section was included which provides guidance on such things as obtaining a marriage license in any state in the country, wedding etiquette and ceremonies. A self-help section features information on various relationship and life issues, including how to handle post holiday blues, creating a healthy relationship, anger management, what to do if you think your shipmate may be suicidal, alcohol and drug facts, overcoming jealousy, single during the holidays, how good people make tough choices, tips on coping with stress, and much more.

ChaplainCare cannot take the place of ministry by a chaplain, but is meant to expand access to religious information and spiritual resources to over one-third of Navy, Marine, and Coast Guard personnel who do not have

ready access to a chaplain. Presently, many Sea Service units are fortunate to have chaplains and Religious Program Specialists assigned to them. However, almost one-third of them do not. Submariners, Marines, and hundreds of Coast Guard personnel and their families who serve in isolated locations or on vessels without a chaplain do not have ready access to spiritual support and religious information. While ChaplainCare can never and does not purport to take the place of a person-to-person encounter with a real chaplain, it seeks to direct service members to religious information, online spiritual resources, and to a chaplain when needed.

ChaplainCare is specifically designed for tomorrow's Sailors, Marines, and Coast Guard personnel. The Navy's next generation Sailors—Generation Y—who will make up the vast majority of Sea Service members in the next 10-20 years, is so technologically savvy they currently obtain most of their information from the Information Super Highway, the Internet.

As the Navy moves toward greater connectivity via the Navy-Marine Corps Intranet ashore and IT 21 afloat, ChaplainCare leads service members to spiritual resources in a high tech environment and places the reminder of "chaplain and spiritual care" on the desk top and before the eyes of every Sailor and Marine, every day.

In today's world, that kind of name recognition and branding are invaluable and serve as a constant reminder of the chaplain's care available for the asking, any time, anywhere. ❑

Chaplain Vieira is Special Assistant for Pastoral Care (MED-00G), Bureau of Medicine and Surgery, Washington, DC.

ChaplainCare User's Guide

ChaplainCare is both an ***interactive*** and an ***informational*** website. Here is a snapshot of some of its features:

ACCESS ADDRESS:
www.ChaplainCare.navy.mil or www.AnchorDesk.navy.mil

INTERACTIVE CHOICES:
ASK A QUESTION OR RECEIVE INFORMATION - *leads to a pre-addressed email where you can receive a response within 24 hours.*
TALK TO A CHAPLAIN - *leads you to a toll free number to the Navy's Integrated Call Center, Norfolk, VA (1-877-41-TOUCH or OCONUS DSN: 510-42-TOUCH) where you will be connected to a Chaplain-on-Call*
PROVIDE US FEEDBACK ABOUT THIS SITE - *leads to a pre-addressed email where you can share your thoughts on how we can improve the ChaplainCare site.*

INFORMATIONAL CHOICES:
DEVOTIONS:
Top: *Links to 18 Daily Devotions (including one in Spanish)*
Bottom: *120 Devotions written by Navy Chaplains*
PERSONAL PRAYER: *78 prayers designed to address various feeling states and life occasions*
SELF-HELP: *Information about various relationship and life issues.*
ABOUT VARIOUS FAITHS:
Top: *Synopsis of 22 religions. Click on "Christianity" and you will open to another page:*
Top: *A synopsis of 26 faith groups, beliefs and practices (most written by the denominations themselves)*
Bottom: *Links to the official websites of 26 faith groups*
Far Bottom: *Links to over 400 other faith groups*
Bottom: *Links to websites on over 400 other faith groups*
WEDDINGS: *Frequently asked questions about Navy weddings.*
Bottom: *link to a wedding website with information about marriage licenses, wedding services, wedding etiquette, and a variety of other topics.*
CREDO CENTERS OF EXCELLENCE
Websites and schedules for all CREDO Centers
COMMUNITY SERVICES PROJECTS: *Information about Project Good Neighbor and other Navy Flagship community service projects*
QUALITY OF LIFE MALL
Link to the official website of CNO's LIFElines
NAVY-MARINE CORPS RELIEF
Link to the official website of NMCRS
AMERICAN RED CROSS
Link to the official website of ARC

ChaplainCare Team: CAPT Steve Epperson, CAPT Jane Vieira, CDR Shelia Robertson, CDR Gerry Blackburn, LCDR Jim Fisher, LCDR Mike Smith, LT Cory Cathcart, RPCM Isaac Matthews, RPCS Steve Jackson, RP1 Partick Turner, and RP2 Wanda Wright.

Rota Hospital Supports Space Shuttle Mission

LTJG Bill Davis, USN

***"Houston, we have liftoff of the Space Shuttle* Atlantis."**

Photos by the author

HN Phonthip Manivanh waits in anticipation for the launch of the Space Shuttle *Atlantis*, Mission STS-101.

It is these words that once again propel the U.S. space program into yet another chapter. Last April's scheduled launch of Mission STS-101 with six U.S. astronauts and one Russian cosmonaut was a mission to provide the International Space Station with new supplies, including needed batteries and a broken antenna system.

But what if something goes wrong? It is hard to forget the explosion of the *Challenger* less than 2 minutes after liftoff in January 1986. What if there was engine failure? What does the National Aeronautics and Space Administration (NASA) do when it is confronted with the unexpected?

There is a host of people standing by ready to assist with such a problem, including the medical staff from Naval Station, Rota. It is their job to pre-stage themselves at Moron Air Base, about 80 miles from Rota, which is one of four trans-Atlantic abort landing (TAL) sites in the world. The other sites are Zaragoza, Spain; Benguerir, Morocco; and Banjul, Gambia. It is the medical team's job to stand by for each flight, ready to provide medical assistance to the astronauts in case of an aborted flight and a shuttle landing in Moron.

LCDR Lynn Flowers, MC, the director of the Space Shuttle Support Team from Rota, says it is a great opportunity for the hospital to work with NASA and really be a part of history with the space shuttle missions. It is medical support that could potentially be critical to the astronaut's lives in case of an aborted mission.

"NASA establishes certain criteria for us," Flowers says. "All the corpsmen have to be Emergency Medical Technician (EMT) certified, and the astronauts require

one EMT each, along with one trauma trained physician for four astronauts." Two nurses also accompany the medical team, although not required by NASA, but it is a service the hospital provides as well.

The procedures are similar to what the nearly 20-person medical team goes through when they perform a mass casualty drill or trauma assessment. But they say it is a bit more exciting.

"It makes me feel very good to be involved in this type of event," says HN Phonthip Manivanh, an EMT whose primary job would be to assess an astronaut's condition once cleared through decontamination.

Medical Drill

While the shuttle was scheduled to launch that evening (Rota time), the Rota medical team prepared a mock trauma scene in order to simulate a real disaster in case of a landing at Moron and injuries were sustained. The training looks good on paper, according to Flowers, but it is not until you actually conduct it that you can work out any bugs in the system, or be able to see areas that need improving.

About 4 hours before the scheduled launch, the medical team "treated" the injured in a simulated drill just as though it were the real thing. HM2 Yvette Yeager, whose normal job at the hospital is in the surgery clinic, says the training evolution gives the team the experience it needs. "The training builds our confidence level, as well as our skills and knowledge to do things faster and better." She is one of the seven EMT's on the team.

HM3 Thaddeus Estacio is also an EMT. Just 5 years ago, he left San Diego for the Navy, and sees his role in this real-world mission as a "big thing and nice experience," while working with the shuttle mission crew and the people at Moron. Estacio's patient in the drill had a lump in his neck, weakness in his arms, and no sensation from the waist down. "Possible spinal injury "Med Code One," he notes.

Medical staff observed the mock trauma drill in order to evaluate weak and strong spots. Being ready for the unexpected is what the corpsmen, doctors, and nurses train for. "Overall, the crew did a great job," says LT Rebecca Carlin, MC, Rota Hospital flight surgeon, and observer for the training.

"I feel very comfortable that if the shuttle did come and land here, the training that we do regularly would enable this team to do an outstanding job," says Flowers.

What can go wrong?

While no space shuttle flight has ever had to use one of the TAL sites, having these locations available for a contingency is crucial to the launch, says LCDR Alan Poindexter, an astronaut with NASA. He says the sites like Moron are similar to an insurance policy. It's there in case you need it.

Poindexter points out that if there is a problem in the first few minutes of the flight, the shuttle could go back to Kennedy Space Center at Cape Canaveral, FL, where it was launched. But as the launch progresses, from about 4 minutes to 8 minutes, he says aborting the mission could

LT Rhonda Stell, NC, and HM3 Thaddeus Estacio discuss possible treatment options for an "astronaut" victim.

LCDR Joseph Paulding, MC, and HM2 Yvette Yeager practice drills prior to the scheduled launch of the space shuttle.

mean landing at one of the TAL sites. By the 8-minute mark, the shuttle has accelerated to about 17,000 miles per hour. The thrust of the shuttle engines is more powerful than 35 jumbo jets at takeoff, and timing is of great concern.

In case of engine failure during the 4-minute span, the flight director at Mission Control in Houston would tell the shuttle crew to abort when, according to Poindexter, the shuttle would climb to 250,000 feet, turn off the external tank, then glide to Europe. That's when the site such as Moron would come into play with the Rota medical team standing by to provide any treatment to the astronauts. The runway at Moron is fully lit just like the runway at Kennedy Space Center. Poindexter says the process from mission abort to landing at Moron would take about 30 minutes.

Once on the ground at Moron, a crew from the base, consisting of Americans and Spanish working together, would ensure that the shuttle was not leaking fluids and was free of anything toxic. When the shuttle was cleared, the astronauts would have to clear decontamination before proceeding to the care of the medical staff.

Teamwork

Working as a team is the primary goal of LCOL J.C. Crownover, the 496th Air Base Squadron Commander at Moron. While Americans and Spanish from the base are working the shuttle recovery, it is the support from the Rota Hospital that is vital, he says. "It couldn't be a contingency site without the medical support from Rota."

Also, Rota provides weather support from the Naval European Meteorology and Oceanography Center (NEMOC) and flight support from the C-12 crews of Rota during the shuttle missions.

Increased Shuttle Support

The launch of the *Atlantis* was postponed a few weeks until May because of high winds at the launch site, but the training gave the Rota Hospital staff the experience and confidence they need in order to do their job better. It is a role that should be increasing, according to Poindexter. "Once we have the space station with a continuous presence, there may be up to six or eight flights a year."

The Rota Hospital staff says they will be ready . . . ready for the unexpected, just in case the shuttle has to abort the mission and land at Moron. It is a job they train for, and, as Estacio says, it is a job they need to do fast and do well. "Lives are at stake." ❑

LTJG Davis is assigned to the Public Affairs Office, Naval Station, Rota, Spain.

Protecting the Warfighter from Laser Eye Damage

Lasers are employed on the battlefield for many reasons—distance estimation, target illumination, reconnaissance, communications, and as weapons. The Department of Defense Laser Master Plan, issued on 24 March 2000, states that high-energy laser weapons have the potential to emerge as one of the principal weapons technologies underpinning U.S. national security interests in the 21st century.

Advances in laser technology have made it possible for a marksman on the ground to target an aircraft in flight with a low to medium power laser and jeopardize the aircrews' vision and mission. These portable laser weapons are capable of producing physical damage to the eye or disabling flashblindness. The unprotected human eye is extremely sensitive to laser radiation and can be permanently damaged from direct or reflected laser beams. Even at non-damaging power levels insufficient to cause burns or tissue damage, laser exposure can degrade a pilot's ability to complete the visual tasks necessary to maintain controlled flight, spatial orientation, and visual perception in general.

How real is this laser threat during flight operations? Beginning in 1993 a research team collected field data on the ability of a laser marksman on the ground to track and illuminate aircraft during weapon delivery and search and rescue training exercises (day and night). The data included over 200 flight profiles (F-18, F-16, and H-60) collected at a number of test ranges throughout the United States.

According to the team leader, Navy scientist LCDR Sean Biggerstaff, MSC, "During data collection efforts in Fallon, NV, we evaluated whether a marksman could put laser light on an aircraft at tactically significantly ranges. For example, we collected data on a number of F-18 flights, with the marksman, using a hand-held laser, tracking an aircraft moving at 500 knots. We then evaluated at which points in the flights the marksman had a clear line of sight into the cockpit. We did the same thing for our night time helo (H-60) tests." These one of a kind field tests were made possible only through the continual support of the Naval Strike and Air Warfare Center (NSAWC) and the command's flight surgeons.

Field data collection efforts at NAS Fallon, with a laser "sniper" tracking a helicopter.

To predict the potential eye damage threat and determine the safe flying areas, LCDR Biggerstaff and his research team at the Naval Health Research Center Detachment (NHRCDET) Brooks AFB, San Antonio, TX, developed the computer-based Laser Threat Analysis and Mission Planning System (LTAMPS).

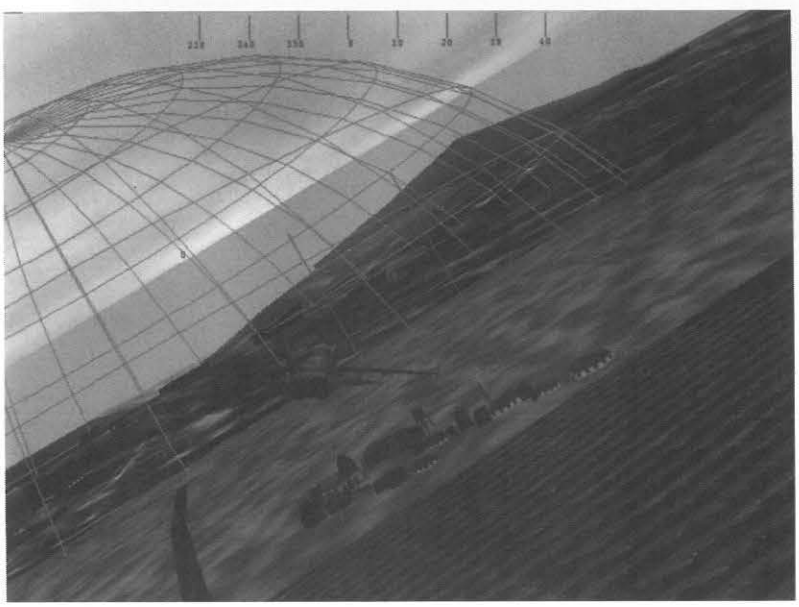
LTAMPS looks like a sophisticated computer game and the player, with the point of view of the pilot in the cockpit, can fly low across a landscape, avoid digital sharpshooters standing on hills below while colored grids bridge the computer screen with changing vibrant hues alerting the pilot to increasing harmful laser zones. But the system is not a game. LTAMPS is a comprehensive computer system that provides validated, real-time bioeffects modeling of ground-to-air laser engagements.

Current scenarios include 200 actual flights the research team re-created using a multitude of information resources including elevation terrain maps overlaid with satellite imagery, detailed atmospheric information, aircraft configurations, and laser tracking models. Each data point was meticulously plotted to parallel actual flight records and conditions. LTAMPS can project a threat location in a variety of geographical sites around the world, select a specific laser system to include the energy level and pulse width, and choose the aircraft type. A pilot can train using the programmed flight profiles or assume control and fly with a joystick. A pilot flying a mission on LTAMPS can actually compute, based on the aircraft configuration and the surrounding terrain, whether there is a clean line of sight between the shooter on the ground and the cockpit. The system can also compute the amount of time the aircraft is in the damage, glare, or flashblindness zones of a given system and compute if there is an opportunity for the shooter to get the laser beam into the cockpit.

Working cooperatively with Army and Air Force researchers at the tri-service Directed Energy Bioeffects Laboratory at Brooks Air Force Base, the Navy team incorporated existing military laser databases into LTAMPS. The Army database is a bioeffects model focused on the molecular damage caused by lasers and the Air Force database is a retinal damage and flash blindness model. The Navy's product—a unique "fly the aircraft" playback utility is based on research focused on human performance and functional recovery.

LCDR Biggerstaff summarized LTAMPS, "This is aviation medicine at work. We are identifying what the biohazards are from laser systems. By developing real-world models, we can determine the standoff distance and keep our aircrews from being blinded. The computer scientists put together all the interfaces. Aviation medicine determines the ocular damage. LTAMPS can be used as a mission planning or training tool to provide the warfighter with a realistic assessment of the bioeffects and threat of ground-based lasers to aircraft and aircrew in a specific theater of operation."

According to CDR Melvin J. Ely, MSC, Officer in Charge at NHRC Brooks, "Although we may not have too many laser weapons in the inventory today, the future will likely be different. And while these laser systems may be defensive in nature, capable of shooting down incoming missiles and rockets, such systems could easily have offensive capabilities. Lasers on the battlefield may pose a much more serious threat to aircrews and operational effectiveness in the future than today. LTAMPS is helping the Navy, and Navy medicine, prepare for that future." ❑



Example of the type of visualization of laser threats that LTAMPS can provide during mission playback or mission rehearsal.

—Story by Doris M. Ryan, Medical Research and Development Division (MED-26), Bureau of Medicine and Surgery, Washington, DC.

Photos provided by the Naval Health Research Center Detachment, Brooks AFB, San Antonio, TX.

Feature

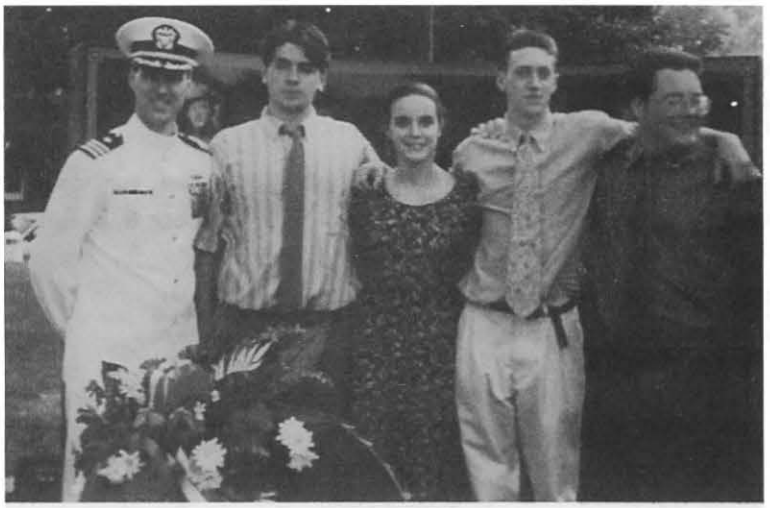
New Jersey Students Design Memorial to Honor Local Heroes

Craig E. Burgess

Memorial Site

Audubon, NJ, is a very special borough. It has three Medal of Honor recipients—one for bravery in World War I and two who gave their lives fighting for our nation in the Korean War. Both Korean war heroes, Edward C. Benfold and Nelson V. Brittin, have been honored by the Navy with two vessels named in their memory. The USS *Benfold* (DDG-65) was commissioned in 1996. The USNS *Brittin* was christened in 2000.

In the Fall of 1993, soon after the Navy informed students at Audubon High School that a new destroyer would be named in memory of HM3 Edward C. Benfold, four seniors approached the principal, William Westphal, with plans for a patriotic project—the construction of a Medal of Honor Memorial Site on the cam-



CDR Mark E. Ferguson, III, the first commanding officer of the USS *Benfold* (DDG-65), poses with the four Audubon HIgh School students who designed the memorial site and chaired the fundraising.

pus. The students received approval for the project and, within 9 months, raised $17,000 through fundraising efforts within the community. The memorial site was dedicated in a special ceremony on 4 July 1994. One of the special invited guests was the prospective commander of the USS *Benfold*, CDR Mark E. Ferguson, III, who attended the ceremony with his wife and two children.

In August of 1995, CDR Ferguson returned to the borough, bringing 30 of the ship's crew, who were in training in Philadelphia prior to boarding their new vessel at Pascagoula, MS. During the visit there was a service at St. Mary's Episcopal Church in neighboring Haddon Heights (Benfold's spiritual home, where a stained-glass window, containing a replica of the Medal of Honor, was dedicated in 1954), a luncheon with members of the Audubon firefighters, and a softball game.

These two events were the beginnings of a lasting friendship between the borough and the officers and crew of the ship. Following the commissioning on 30 March 1996, students in Audubon's two elementary schools began writing pen pal letters to crew members. In May of the following year, CDR Ferguson spent a day in Audubon, meeting with students in all three schools. He then helped initiate a special visit to Audubon each 4th of July by the ship's "Sailor of the Year."

The students at AHS established a Memorial Foundation and hold services at the Memorial Site on Memorial Day, on the 4th of July, and on Veteran's Day. In February 1998, members of the Korean Club at AHS began a fundraising campaign to build a walkway leading up to the memorial site, which was dedicated during the Memorial Day Service in 1998.

A very special event took place in April of 1999. A patriotic parade was held in town to welcome two members of the crew: the "Sailor of the Year" and the co-author of a new book that salutes the work of the students, and presents a history of the town, the life of local hero Edward C. Benfold and the history of the USS *Benfold*.

The friendship was strengthened in 1999, when the new executive officer of the ship, LCDR Todd Leavitt, visited the high school and brought two special gifts for the students, a U.S. Navy flag and a 5-inch shell casing inscribed to "the students of Audubon High School," making the students official shipmates of the crew.

At the 1999 Memorial Day Service on the campus of Audubon High School, the students were recipients of a special award. CWO Kenneth T. McCauley, Commander of the Military Order of the World Wars, presented the school and the community the Patrick Henry Bronze Medallion for Patriotic Achievement.

For more about this special community and about the ongoing patriotic activities of Audubon's young citizens, write:

William Westphal, Principal
Audubon Jr-Sr High School
350 Edgewood Avenue
Audubon, NJ 08106-2299

For information about the new CD and the book which salute the students and the officers and crew of the USS *Benfold* (DDG-65) write Craig E. Burgess, 327 Washington Terrace, Audubon, NJ 08106-2148. ❑

Mr. Burgess, co-author of *The Green Wave and the Navy: The History of the USS* Benfold *(DDG-65)*, is an educator, poet, and lifelong resident of Audubon, NJ.

Feature

Marketing Prevention in a Data Driven Environment: The Magic of People

R.W. Rendin, MSC, USN
R.C. Washburn CHPD

Do you understand business case analyses, performance metrics, productivity measures, net present value, return on investment, demand forecasting, capacity management, outcome analysis, etc.? These terms and the numerical concepts they represent are gaining greater significance in creating and maintaining programs within the Department of Defense. Every health care or prevention proposal will have to prove its worth based on these evolving criteria.

In the prevention community, we are quick to recognize the effects viruses, vectors, toxins, injuries, and other challenges have on the health of the population. Statistics, numerator and denominator data, incidence and prevalence rates are the tools of the epidemiologist. For example, at the Navy Environmental Health Center, the motto "Think Populations, See Individuals" recognizes that the objective is not only to benefit groups of people by data driven solutions to complicated public health issues, but also to continue to be concerned about specific individuals served and their needs.

When using this population based concept for making business decisions, it is imperative to realize that accurate calculations and analyses are necessary but not sufficient. Expenditures for developing new initiatives or for maintaining extant programs still require the support and approval of a human being, not a microchip. The authors claim that skilled personalized marketing is as important in gaining program endorsement as is carefully prepared data. It is the one on one individualized marketing approach, using creativity in relating to and connecting with people, that results in synergy, almost like magic! For example, in health risk management, it is the concern for and skillful communication with people that gain public support and acceptance crucial to the success or failure of the management decision. One of the keys to effectiveness in the field of communications is understanding audiences and their needs. When operating in a high concern low trust environment, a basic tenet of the health risk communication discipline is that the people you are trying to convince are thinking on a subconscious level: "I don't care how much you know until I know how much you care." The same principle can be applied to data driven pitches to decision-making authorities, which are often under crushing multi-faceted fiscal pressures. Convincingly conveyed recognition and insightful understanding of their objectives, political realities, personal preferences, and long-term goals will gain attention. Employing excellent communications skills, showing enthusiasm and sincerity, and demonstrating how resources can be saved is the prerequisite for success. By illustrating how this saving will directly support a priority project of the person being briefed yields an even higher success rate. This requires doing your homework and is very much aligned with author Steven Covey's Habit Number 5, "Seek first to understand before you can be understood," in his book *The 7 Habits of Highly Successful People*.

As the Navy and Department of Defense progress with long-term medical models and plans, such as the "Population Health Improvement Plan and Guide," marketing the plan will very much be a key to its success. The term "condition management" is introduced in this document. If skillfully articulated and accepted, condition management will be the new paradigm that breaks down the artificial barriers in thinking about prevention versus disease management efforts. Its organizational oversight, business processes, manpower infrastructure, and data/information support are designed to fuse health promotion, illness prevention, illness care, disease management, and case management into the continuum of condition management. Senior leadership's understanding and com-

mitment to this concept is crucial to its success in reducing demand and associated costs of the more complex components of the continuum, i.e., disease and case management. This and other concepts become reality when creativity, health education, a skilled marketing plan, and finely honed interpersonal skills result in a human connection that resonates with internal and external customers.

From another perspective, former Chairman of the Joint Chiefs of Staff, GEN Colin Powell provides some insightful and contrarian thoughts when using data, relating to people, and exercising leadership that help place things in perspective. Here are a few: "Don't be buffaloed by experts and elites. Experts often possess more data than judgment. Elites can become so inbred that they produce hemophiliacs who bleed to death as soon as they are nicked by the real world." He further explains that small companies and startups don't have the time or money for analytically driven detached experts nor can they subsidize lofty elites. When necessary, the president answers the phone and drives the truck; everyone on the payroll visibly produces and contributes to bottom-line results or they're history. But as companies get bigger, they often forget who "brought them to the dance," i.e., things like all-hands involvement, informality, market intimacy, daring, risk, speed, and agility—all people skills.

But there is always a balance to achieve. He also states, "Never neglect details. When everyone's mind is dulled or distracted the leader must be doubly vigilant." As always there is that people connection. He sees organizations, plans, and management theories as not really accomplishing much. Success or failure is dependent on the people involved. Great deeds are accomplished by attracting the best people with people being an organization's greatest asset in a "brain based" economy. Leaders must immerse themselves in the goal of creating an environment where the best, the brightest, the most creative are attracted, retained and most importantly their magic unleashed.

In this business environment, there is the concept of a "marketing mix," or the four "Ps" of marketing which include: 1) product, 2) price, 3) distribution (place), and 4) promotion. There is also a "promotion mix," which is the combination of promotion tools used by an organization and consists of public relations, advertising, sales promotion, word of mouth, publicity, and personal selling. At the center of the promotion mix is the "value package," which is the product itself. Because the military's purpose and sources of funding are different from private industry, we often overlook the necessity of marketing and, particularly, promoting. Accordingly, a concept which has great potential for supporting military population health issues is referred to as social marketing. Social marketing seeks to influence behaviors that benefit the target audience, not the marketer (but it does). This technique has been used extensively in international health programs, and is being used with more frequency in the U.S. for such diverse topics as drug abuse prevention, cardiovascular disease reduction, and organ donation.

In the Military Health System, the success of population health programs is the keystone for controlling costs in a capitated budget environment. Like commercial marketing, the primary focus of social marketing is on the consumer—on learning what people want and need rather than trying to persuade them to buy what we happen to be producing or stockpiling. The planning process takes this consumer focus into account by addressing the elements of the "marketing mix," the four "Ps" of marketing described earlier. Social marketing also adds a few more "Ps." **Partnership**—Health issues are often so complex that one agency can't make a significant impact by itself. Teaming up with other organizations, especially those in the community, are needed to really be effective. Figuring out which organizations have similar goals as yours (not necessarily the same goals) and identifying ways you can work together is paramount as it maximizes resources. **Policy**—Marketing programs often influence individual behavior change, but true sustainment is achieved when the environment supports long-term change. Dynamic media advocacy programs can be very effective in fostering policy change. **Politics**—Health issues are often controversial or complex, such as safer sex or violence, and need political diplomacy with community organizations to gain support, to get access to the target audience, or to head off potential adversaries.

Success, in addition to having good data, must employ marketing concepts which include gaining vital leadership support; communicating a positive message; recognizing champions, volunteers, and participants; subject matter experts; and other key players. Therefore, we would add one additional "P" to the marketing/promotion mix—**People.** In these people and in many others you will find a synergy that produces magical solutions.❑

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U.S. Naval Hospital Okinawa's Neonatal Intensive Care Unit: Providing Health Support in the Western Pacific

CDR Mary K. Kenney-Gutshall, NC, USN

The hopes and dreams of Air Force SSGT Christopher and Roseanna Kronshagen hung in the balance in the neonatal Intensive Care Unit (NICU) of the U.S. Naval Hospital, Okinawa, as their 5-day-old daughter, Alexis, was placed onto heart-lung bypass in an extraordinary attempt to save her life. Alexis and her parents had already endured more than they could ever have imagined. The long road to recovery was only beginning, however, as doctors and nurses prepared her for what would prove to be a history-making aeromedical airlift—the longest transport of a patient on heart-lung bypass ever attempted.

Even before Alexis was born, doctors advised Roseanna that her amniotic fluid contained meconium, or fetal feces. Many babies are born every year with this condition. Alexis was one of the unlucky few to develop meconium aspiration syndrome, which occurred when she breathed the feces into her lungs. Moments after birth, her parents watched as medical personnel rushed her to the NICU where doctors put her on a ventilator and tried to reverse the damage to her lungs caused by the meconium. She rapidly developed persistent pulmonary hypertension, and despite days of exhaustive efforts of the NICU doctors and nurses, she failed to improve.

Photos courtesy of author.

Leaving USNH Okinawa.

"In a vast majority of cases of meconium aspiration we are able to support the infant through to recovery," noted Dr. Peter Grubb, one of the two neonatologists who cared for Alexis. "In her case , we were able to stabilize her; however the severity of her lung injury was beginning to cause her heart to fail," he added.

"Without ECMO her chances of survival were about 10 percent and dropping," observed Dr. Daniel Dirnberger, the attending neonatologist. ECMO, or Extracorporeal Membrane Oxygenation, is a heart-lung bypass process that allows the heart and lungs to relax and recover from injury. Alexis needed to go to an ECMO center, but in her current condition, she would not survive standard aeromedical evacuation. The only way to save her life was to place her on ECMO in Okinawa and transport her on bypass. The only center in the world with the experience and equipment to attempt a trans-Pacific ECMO transport is Wilford Hall Medical Center, in San Antonio, TX.

All the neonatologists and many of the NICU nurses at USNHO trained at Wilford Hall and have experience in ECMO and ECMO transport. In fact, Dr. Grubb was the medical director of the Wilford Hall ECMO program before coming to Okinawa. "Alexis was uniquely fortunate to be born here at the U.S. Naval Hospital Okinawa, the WESTPAC referral center for critically-ill newborns, especially considering the combined ECMO experience we have here. We were able to anticipate the supplies, blood products, and support the transport team would require," said Dirnberger. "Heart-lung bypass is not usually performed at this institution," according to CAPT Sharon Beard, NICU's Head Nurse. "The entire NICU staff worked together, even though there was a high patient load at the time. Many areas in the hospital did their part and came together for the sake of this baby. It made the difference."

ECMO on C-17, to Kelly AFB.

On 19 August, the 15-person transport team rolled into the NICU, and within a few hours, Alexis's heart and lungs began to relax as the bypass circuit took over. Once she stabilized on the circuit, the team departed on the most medically and logistically complicated airlift mission imaginable. Orchestrated from the Tanker Airlift Control Center, Scott AFB, IL, the mission was supported by dozens of airlifters, medical specialists, and three aircraft. A C-9 Nightingale carried them the 900 miles to Yokota AB, Japan, where a C-17 Globemaster III was waiting to carry them the remaining 5700 miles to Kelly AFB, San Antonio. Because every landing and take-off increases the risks of complications with a patient on bypass, the airlift included a delicate midair refueling with a KC-10 Extender on the 14-hour leg to San Antonio.

Alexis responded well to ECMO, and she came off bypass support after 7 days. According to Dirnberger, she recovered quickly thereafter. Alexis returned to Okinawa where she now lives with her parents. Today she is a healthy 4-month-old child with no apparent residual lung disease.

The possibility of attempting such a transport had been previously considered. Said Dr. Grubb, "Earlier this year the Air Force Surgeon General, MGEN Paul K. Carlton, Jr., asked us to review the feasibility of transport ECMO to Okinawa. Although it would be the longest such mission on record, we worked with TPMRC at Yokota, the PACAF Surgeon's office, and Wilford Hall to determine what options were available for babies in Alexis's situation, and when an extraordinary therapy like transport ECMO across the Pacific should be considered. Based on these discussions we were ready to get the Wilford Hall team the data they needed to determine that Alexis was an ideal candidate for the first trans-Pacific ECMO transport."

"They tell you in briefings about your medical benefits in the military, but only when something like this happens, and your daughter's life is saved, do you really appreciate what you have," said SSGT Kronshagen.

The U.S. Naval Hospital, Okinawa Neonatal Intensive Care Unit is a 14-bed Level III facility, serving the entire WESTPAC population. ❑

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Feature

The Navy Flight Surgeon: Raison d'Etre A Brief History

CAPT C.O. Barker, MC, USN
CAPT R.E. Mitchell, MC, USN (Ret)

From the early 20th century, with the advent of "the flying machine" and subsequent growth of military and civilian aviation with all its inherent dangers, the need for specialized medical support has always been recognized.

During World War I and again during World War II, military leaders placed much emphasis on developing the optimal pilot man-machine combat unit. The pilot was considered the "weakest link" and so a great deal of attention was placed on the physical qualifications of prospective pilots as well as on research into the physiologic effects of the aviation environment.

The overall result of these efforts led to the development and implementation of an evolving array of personal life support systems and training devices that would prevent potential adverse effects as well as maintain and, in some instances, enhance the pilot's flying performance. In the early years, because air combat was becoming an essential part of our nation's war doctrine, and because civilian air travel was rapidly developing, significant financial and human resources were applied to make flying both safe and effective. Later, similar resources were applied to our nation's space program in the 1960's leading to a successful manned moon landing in 1969.

The flight surgeon has been a key participant from the beginning. Indeed, the flight surgeon has been medical professional, intense researcher and inventor, executive, policy maker, and sometimes politician—always a strong advocate for aviation.

The name "flight surgeon" came from a long-standing military tradition that referred to an Army field medical officer or a Navy ship's medical officer as "surgeon." With the advent of military aviation, a medical officer primarily involved with the examination, screening, and subsequent care of a pilot began to be referred to as a "flight surgeon." As our medical understanding of the complexity and danger of the aviation environment increased and as it became imperative to identify only the "best of the

best" candidates for pilot training, formal instruction of flight surgeons became necessary.

The first school established for training medical officers in flight surgery was the Army's School for Flight Surgeons at Hazelhurst Field, Mineola, NY, in May 1919. The school was co-located and came under the Army Medical Central Research Laboratory.(*1*) This kind of arrangement between medical training and research was to become for many years the *modus operandi* for the flight surgeon—clinical aviation medicine with research and technology, inextricably bound to each other.

In November 1919 the Army research lab and school was moved to Mitchell Field, Long Island. It was there 3 years later that the Army trained the Navy's first five Navy flight surgeons—Lieutenants Victor Armstrong, Louis Iverson, Julius Neuberger, Page Northington, and Carl Robertson.

In November 1924, the chiefs of the Navy Bureau of Aeronautics and the Bureau of Medicine and Surgery authorized Naval Flight Surgeon designation for those formally trained in aviation medicine. In January 1927, the first course of instruction for flight surgeons to be given in the U.S. Navy was a 3-month course at the Naval Medical School, Washington, DC, located at the site of the old Naval Observatory at 23rd and E Streets, N.W.

U.S. Navy Photo

***Saratoga* with a deck-load of aircraft.**

The Navy's School of Aviation Medicine in Pensacola was established in November 1939 and graduated its first class of Naval Flight Surgeons in November 1940. Captain A.C. Read, commandant of NAS Pensacola, presented the first pair of Naval Flight Surgeon's wings, fashioned by the Dental Department at NAS Pensacola, to CAPT Frederick Ceres, MC, USN.(*2,3*) The Navy Flight Surgeon training program has resided in Pensacola since then.

Throughout aviation medicine history, the naval flight surgeon has had one major *raison d'etre* or "reason for being"—to select and take care of the pilot and crew of aircraft. MAJ Theodore Lyster of the Army Medical Corps actually conceived the role of the flight surgeon and defined it in terms of "selection, care, and maintenance of the flier." Indeed, by selecting only the best candidates and keeping them healthy, the flight surgeon could better ensure safe and successful military missions.

This need to select only the best fliers was prompted in part by a British lesson learned during World War I. The British Research Council stated that of 100 fliers killed in combat, only 2 died from combat injuries, 8 died of inherent aircraft defects, and the remaining 90 died because of physical deficiencies or other problems with the pilots themselves.(*4*)

Flight surgeons have developed elaborate physical standards and tests over the years to screen out the "imperfect" candidate and screen in the "perfect" one. Interestingly, physical standards have varied cyclically as the number of Navy pilots needed has changed with war and peace. During wartime the standards have been stricter as the supply of candidates for pilot training has been greater, while during peacetime standards have been relaxed, as candidate demand for training has been less.

The Navy Surgeon General stated in his Circular Letter of 8 October 1912, entitled "Aviation Duty: Physical Examination of Candidates," that "all candidates for aviation duty shall be subjected to a rigorous physical examination to determine their fitness for such duty." Nevertheless, the earliest aviation physical standards were far from "rigorous."(*5*) The potential pilot had only to have normal visual acuity without glasses, adequate depth perception, and normal color vision. Hearing was checked with simple speculum and a mirror. Equilibrium was checked by having the person stand still with knees, heels, and toes touching, and having them walk forward, backward, and hop around the room with eyes open followed

by a second time with eyes closed. The rest of the physical exam was standard, checking primarily the heart, lungs, and extremities, including a set of exercises. A number of medical conditions were disqualifying, such as complications from childhood illnesses, blows to the head, gastrointestinal problems, skin problems, venereal disease, and neurological symptoms such as seizures, dizziness, or headaches. If the candidate passed all the above, he was acceptable to enter flight training.

After World War I, physical standards became much stricter and more comprehensive as aircraft became more sophisticated and more expensive. Today, there is a whole section of the *Manual of the Medical Department*, Chapter 15-65, dedicated to aviation physical standards for accessioning and retention of aircrew. These standards include those not only for naval aviators and naval flight officers, but also for other aircrew, including flight surgeons, aerospace physiologists, aviation experimental psychologists, enlisted aircrew, and other categories of flight personnel.

Just as the pilot selection process has always been a high priority for the flight surgeon, the care and maintenance of the pilot has been of equal if not higher importance. From the earliest times when the Navy "took to the air" and began landing aircraft on water and on wooden carrier decks to present day, the naval flight surgeon has been there to identify problems associated with flight, quickly applying needed research and development of technology to solve those problems. Most advances in aviation medicine have resulted from this need to address specific physiologic problems resulting from three dimensional, high speed, high altitude, low oxygen, low pressure, high G-forces, sustained operations environments, as well as from problems arising from crashes at sea and underwater egress from sinking aircraft. Indeed, although focused primarily on problems of high altitude, the flight surgeon has had to learn and apply special knowledge and skills from every area of military operational medicine—undersea, surface, air, and land—in his/her care of aircrew.

The development of the anti-G suit is one example of the flight surgeon identifying a physiologic problem, applying research, and developing technologies to solve or at least mitigate the problem. The first published observations that centrifugal forces produced by changes in direction of aircraft could cause loss of consciousness appeared during World War I. Although the idea of a pressure device designed to compress dependent parts of the body while under positive acceleration to prevent "black out" was referenced in 1918, it was not until 1932 that LCDR J.R. Poppen, MC, USN, undertook research into the physiologic effects of acceleration and deceleration associated with dive bombing.(*5*) His research pointed to the need for a protective device, and he proposed an inflatable abdominal corset for use by fighter pilots. Nothing was done about his report until 1940 when the Navy approached Spencer corsets in New Haven, CT, with the suggestion that they design a pneumatic abdominal belt along the lines described by Dr. Poppen. They produced a belt with a valve that would allow varied pressure according to the amount of load—the Poppen Belt. Since then, inflatable G-leggings have been added and other modifications have been added over the years. Despite all these efforts, present day G suits are still not completely effective. However, many pilots have been saved as a result of the work of Dr. Poppen and others.

There are many other examples of flight surgeon research, and development of technology to address the physiologic effects of the aviation environment on aircrew—oxygen systems, hyperbaric treatment of decompression sickness, cold exposure, disorientation from vertigo, visual illusions, and motion sickness to name just a few.

Today, the need for the naval flight surgeon is as strong as always. Naval aviation continues to require the young lieutenant flight surgeon to support its unit squadron, to be an integral part of the team and its ready room, to closely monitor its officer and enlisted aircrew, to be its "family doc," to ensure crew medical readiness for forward deployment, and to go in harm's way when called to do so. The flight surgeon continues to be a key member in aircraft mishap investigations, part of squadron human factors committees and boards, and proactive in early detection and prevention of problems with aircrew. Flight surgeons encourage and participate in command health promotion programs and are strong proponents of medical prevention programs.

However, both military and civilian aviation have become very large world-wide industries. Military aircraft have become extremely complex and expensive war machines. Civilian transport aircraft have become larger, more complex, faster, and more numerous. The space industry continues to develop and will soon have space station occupants continuously in space. The people and systems supporting each of these industries have also become more numerous and complex. As a result, flight surgeon medical support has had to become more specialized as well.

The need for training a specialized flight surgeon was recognized by Navy medicine as early as the mid-1950s when the School of Aviation Medicine, Pensacola, was approved for 2 years residency training in aviation medicine by the American Board of Preventive Medicine 8 July 1956.

These specialized naval flight surgeons are trained in population preventive medicine, using the skills of information management, biostatistics, epidemiology, health policy, and executive management to affect the health and well being of its aviation population. Indeed, Navy aerospace medicine expertise has been successfully applied in Navy's Aviation Safety Program with the development of Human Factors Committee and Board processes, with development of the Human Factors Analysis and Categorization System in mishap investigation, and with Navy's Operational Risk Management program. Seventy to 80 percent of all factors leading to aircraft mishaps are attributable to human factors, not unlike the situation reported by the British in World War I. However, despite the fact that these percentages have not changed in almost 100 years, Class A (total destruction of aircraft or death of aircrew) mishap rates have fallen from 300/100,000 flight hours in the 1920s to less than 2.0/100,000 flight hours in 1999-2000. Currently, the nation's medical community, the Department of Defense (Health Affairs), and Navy medicine are each looking to their respective aviation medicine communities to help in developing patient safety programs that will reduce patient care error rates in medical care facilities. This is a witness to the fact that flight surgeons will continue to have significant *raison d'etre* now and in the foreseeable future.

This article would not be complete if we did not state emphatically that the naval flight surgeon could not have done all that has been done in aviation medicine throughout the years if it were not for the support and contributions of our aviation medicine colleagues—naval aerospace physiologists, aviation experimental psychologists, flight nurses, aviation medical technicians, aviation physiology technicians, and our search and rescue corpsmen. The safety and health of our Navy aircrew, Sailors, and Marines have depended at one time or another on the invaluable contributions of each of these specialists. Each has his/her own very interesting story to tell. As we flight surgeons say, "Keep 'em safe and keep 'em flying!"

References

1. Engelman, RC, Joy, JT. *200 Years of Military Medicine.* The Historical Unit, U.S. Army Medical Department, Fort Detrick, MD. 1975;17.
2. *Naval Flight Surgeon's Manual.* Bureau of Medicine and Surgery. 1968;Chapter 1.
3. *Foundation.* National Naval Aviation Museum. 1992.
4. Noe, A. *Medical Principle and Aeronautical Practice: American Aviation Medicine to World War II.* Order Number 9019301, UMI 300 N. Zeeb Rd., Ann Arbor, MI 48106. 1989.
5. Mitchell, RE. "Aviation Medicine Research: A Historical Review." NAMRL Special Report 92-3. 27 Oct 1992;23. ❑

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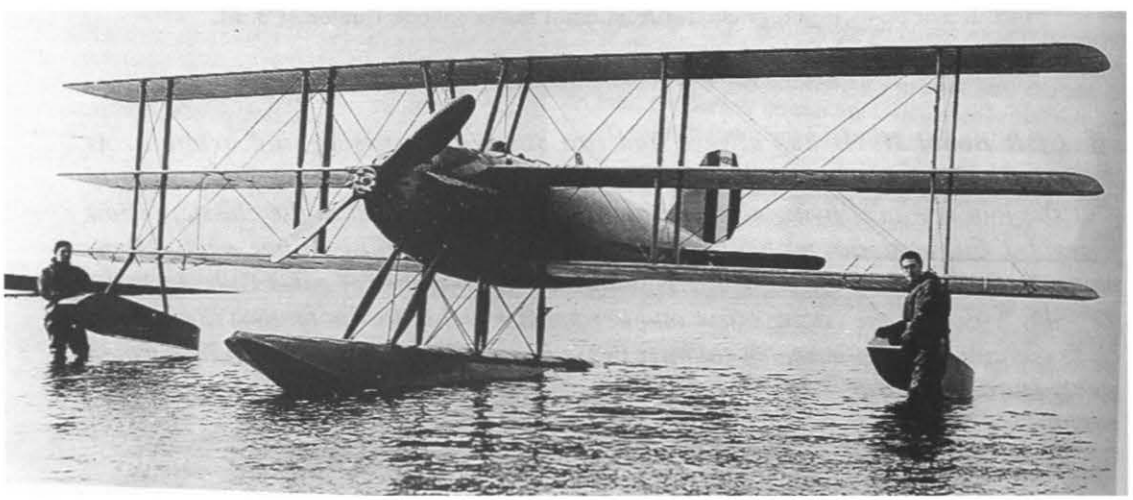

U.S. Navy Photo

Curtiss (Krikham) 18-T Experimental Fighter.

Korean War Flight Nurse

LCDR Bobbi Hovis, NC, USN (Ret.)

BUMED Archives

ENS Bobbi Hovis (right) graduates from flight nurse school, Gunter AFB, AL.

LCDR Bobbi Hovis has always had two passions—nursing and aviation. At her first duty station—Naval Hospital Jacksonville, FL,—it was only natural that she join the local flying club. Before long, she had soloed in the classic, yellow Piper J-3 Cub and earned her private license. After reporting to her next assignment, Naval Hospital Key West, Hovis soon became co-owner of a J-3 Cub. After the duty day was over, the young nurse and her partner would fly out to meet the submarines coming home to base. "We'd buzz the subs and they would wave and we would wave. It was great fun." In June 1950 her two greatest loves would become inseparable.

On June 25th of 1950, I was on night duty at Key West Naval Hospital and, in my course of ward rounds, I went by the O.D.'s (officer of the day) office. Radio broadcasting was interrupted and the announcer said North Korea had invaded South Korea and that we were now at war.

I had submitted my request for Navy flight nurse school sometime in '48 or '49 and I received those orders in August of '50. I took a short leave, and then reported to Gunter Air Force Base, which is a satellite field of Maxwell Air Force Base in Montgomery, AL.

We had a 9-week, very intense flight nursing curriculum, and then with the war and our having to get out there to the Korean theater, that 9 weeks was packed into 6 weeks.

This was a combined school. We had Navy nurses, Air Force nurses, and one Royal Canadian Air Force nurse who went through the syllabus with us. We had our Air Force friends in the class, too, but of course, the Navy stuck together. We were housed in the same barracks, so it wasn't like I was entirely away from the Navy. Besides, we were worked to death just trying to complete the whole course in 6 weeks as opposed to 9. We were either studying or flying or we went to bed to get some sleep when we could.

Photo courtesy of author

Student flight nurse Bobbi Hovis following parachute instruction aboard a C-47, Gunter AFB, AL.

For our student medevac flights we mostly flew in the old C-47s to places like Eglin Air Force Base, where we also had our all-weather training in the climatic hangar. We went through cold-weather, jungle, water, and desert training. These four phases made up our survival training within various types of environments.

Air-evacing a patient is quite different from just putting a patient in an ambulance, so there were things we had to know particularly unique to flight and aviation.

We were required to know how to properly care for head and chest injuries because both are influenced by altitude. In those days, we were not flying in pressurized aircraft.

We did fly polio patients, so we had to manage those old iron lungs. It was difficult because a 37-volt system was required in the aircraft. Not many aircraft were equipped with this system so polio flights were very special, and managing the polio patient at altitude was difficult.

Then we had to be concerned about patients wearing heavy casts, particularly if we had to ditch the aircraft over water. Actually, there would probably be very little we could do for patients in heavy plaster hip spicas—heavy shoulder casts—as far as moving them off the aircraft and into life rafts. So a lot of emphasis was placed on ditching, survival at sea, managing patients as far as getting them out of the aircraft and into life rafts. We were instructed to save ourselves first so that we could care for any survivors. We learned several techniques for surviving in the water. A dead flight nurse would help no one.

Because I had a flying background before flight school, the Air Force chief nurse asked me, prior to graduation, if I would stay on their faculty to teach. Of course, I felt quite honored, but I had worked so long and so hard for my Navy flight nurse wings that I wanted to get out to the squadron and out to the Korean War immediately. That's what I was trained to do. I very graciously declined the offer and told her I'd worked long and hard for this, and that I really wanted to go where the action was. She said she understood.

I immediately got my orders to the Pacific, what we called the Korean airlift. The squadron was stationed at Hickam Air Force Base in Hawaii. But we were seldom there since we island-hopped across to Japan. It was a very long flight. We actually followed the same routes as the glorious old Pan-American Clippers from Hickam to Johnston to Midway to Wake to Iwo Jima, and Guam. In fact, I scuba-dived much of my way across the Pacific it seemed because we were frequently having engine failures early on in the war. I always carried my scuba gear with me, not for ditching, but to dive on the reefs of many of these islands while the aircraft was being repaired.

Medical crews would dead-head out to Japan, meaning that we had no patients going out. As a result, we would rest as much as we could, knowing that these were going to be long, grueling flights back across the Pacific, particularly in non-pressurized aircraft.

The Navy hospital ship *Benevolence* (AH-13) sinking occurred in August of 1950, and then in September we had the C-54 crash at Kwajalein. Between the two, we experienced a lot of tragedy as far as losing Navy nurses on their way out

to the war area. On my flights back from Hawaii to Travis Air Force Base, we'd often fly right over San Francisco Bay, and you could see that beautiful ship lying on her side with the red cross, the green stripe and the white hull clearly visible in the sunlight. Seeing her there on the bottom and knowing that she was never going to be salvaged was heartbreaking.

My first trip across the Pacific was aboard a Berlin Airlift vintage Air Force C-54. In fact, there was one of those old C-54s all flight crews hated to fly. Its fuselage number was 5559. We called her "Triple Nickel Nine." The pilots hated to fly her because they could never put her into perfect trim. So when any crew drew "Triple Nickel Nine," everyone threw up their hands and hoped we would make it across and back.

When we arrived at the 1453rd Medevac Squadron in Hawaii after our training, we mostly flew the old dinosaurs and junkers—C-54s and R-4Ds—that had been used in the Berlin Airlift. Those planes were worn out before they came to the Pacific. They still had coal dust between the cracks in the decks from all the coal that was hauled into Berlin after the war. Quite simply, we were flying risky equipment that perhaps we shouldn't have been flying on those long transits across the ocean. But we had little choice. I rarely completed a mission on four engines.

Later, the Air Force received new C-97 Boeing Stratocruisers, which was pure luxury. They had a very high patient capacity compared to what we were used to. Because stretchers were stacked five high, it was difficult to administer nursing care to the patients on the top stretchers.

Our medical kits were quite large and they weighed about 60 pounds. We would drag along the medical kit and then stand on it to reach those top-level patients. We always tried to place patients requiring the least nursing care at that level, or the tallest of us would take care of him. Often, a tall corpsman would be assigned those patients.

BUMED Archives

Medevac patients from forward area.

It was very grueling as far as rest was concerned. There was very little rest at all. It was a 24-hour round-the-clock flight operation. As it turned out, the winter of 1950 was the worst on record in both Japan and Korea. That was in December of 1950, and we lost a lot of Marines who fought at the infamous battlefield of the Chosin Reservoir. There were Army men lost as well, but I seem to remember only Marine patients. We flew entire planeloads of Marines with nothing but frostbite. They were not well prepared for such a severe winter and with such an overwhelming battle with the North Koreans and Chinese. Entire planeloads of patients without another type of wound except frostbite of the hands and feet were flown home.

In order to bring those frostbitten patients back in the best possible state and in an attempt to save those fingers and toes, feet, and hands we had to keep the cabin very cool—probably in the low 40s, as I recall—so the medical crews were unbearably cold.

Medical flight crews weren't really adequately dressed. We flight nurses wore a Navy leather flight jacket over top of our aviation uniform green jacket and that was it. To keep those cabins as cool as we did, we would rotate— "we" meaning the medical crews. We'd go up to the flight deck to warm up. Needless to say, we had a high rate of pneumonias, severe colds, and URIs [upper respiratory infections], throughout the medical crew members, particularly those on the frostbite flights.

When we got the C-97s, we carried enough litters for about a hundred patients, as I recall. And these frost-

bite patients often had a lot of pain as well as early gangrene. We treated their pain and tried to keep them as comfortable as possible. We used morphine and Demerol for pain control. There wasn't much else we could do for them. If their dressings were weeping, which many of them were, we could do dressing changes as necessary. We could only try to keep them comfortable, and to keep them warm. It seemed as though we used tons of blankets trying to keep them warm in that very cool cabin. Many of these Marines went to the Amputation Center at Oakland Naval Hospital in California.

On a typical flight we would deadhead from Hickam and island-hop to Japan, landing at Haneda Air Force Base, the former Japanese air force base the U.S. took over during the occupation. A flight to Japan might take 15 to 20 hours because we had fuel stops at several islands. Most of us would lie down on litters and try to get some rest on the way out.

Once we landed at Haneda, we fell into bed and got up the next morning to make the trip from Haneda Air Force Base in Tokyo to Yokosuka Naval Station, some distance away from Tokyo. The Yokosuka shipyard was where the naval hospital was located. We would be given a list of our air-evac patients. There was a chief nurse stationed at Haneda and she coordinated with the naval hospital as to which patients would be assigned to this particular aircraft that just arrived.

At Yokosuka, we screened our list of patients. This meant visiting every patient and reviewing his medical history with the ward medical officer—frostbite, gunshot wound, whatever. He would then brief us on specific things we should watch for in flight because we were the only medical personnel aboard, along with the corpsmen. About 0850 in the morning, we introduced ourselves to the patients. Probably, our flight was scheduled for a 1600 takeoff.

Photo by Clayton Davis

Prototype of the Martin Mars JRM flying boat with two Taylorcraft on the wings for scale.

When we finished our briefings, we returned to quarters at Haneda and waited until it was time for patient loading. We went to the flight line where the lines of ambulances had arrived from Naval Hospital Yokosuka. We then boarded the aircraft. Most of us had already planned in our minds which spot in the aircraft a particular patient would be assigned. For example, in the C-97s, I would like those patients requiring more nursing care to be on the second or third tier because that was the easiest level to work from. Lower down or on the deck, your back would break, leaning over to care for a patient. The most critical and those that required the most nursing care were always placed at a level where it was easier to take care of them.

After all were strapped in, we briefed them for takeoff, and the next thing you know, we were taxiing out, were cleared for takeoff, and then were off headed back across the Pacific.

Guam was a staging area, and often those patients in the worst condition would be offloaded at Guam and taken to Guam Naval Hospital at Naval Air Station Agana. There they would be bathed, fed, and their dressings changed.

We also had a staging area on Midway Island. The patients weren't offloaded. Instead, the "Gray Ladies" and other volunteers on the island would come to the aircraft while the flight crews would go into a lounge or some area for a couple of hours rest or to have a meal. The volunteers would then help change dressings and feed the patients.

The thought of water ditching was always with us, especially because of patients in heavy body casts. On one flight from Korea to Hawaii an engine failed. We were about a hundred

miles out of Hickam when we lost a second engine, and here we were with a fully loaded aircraft. Needless to say, there was a glaring possibility of losing a third engine. Hickam dispatched two air-sea rescue aircraft and they took up station, one on our port and one on our starboard wing. Well, it was very reassuring to see those aircraft off each of our wings, but if we had to ditch, all they could do would be to radio our location and initiate rescue operations.

The Douglas aircraft were really old workhorses. Altitude could be maintained on two engines. But if a third engine were lost, we would be in big trouble.

There was a great sigh of relief when we received a direct emergency final approach clearance from the tower, and here we saw all types of rescue equipment—ambulances, cranes, foam-trucks, and fire engines following us down the runway. When the aircraft rolled to a stop and the engines—all two of them—were shut down, all of us aboard knew our guardian angels were on duty that day. And no, we were not flying "Triple Nickel Nine."

One of my C-97 flights would prove to be quite unnerving. We were outbound from Hickam with 20 or so nurses and techs dead-heading to Haneda. Cabin lights were dim, flight boots and shoes were lined up neatly on the deck as most of us were resting on the litters. Even though mostly asleep, I was constantly aware of engine sounds. I think all people who fly airplanes—the pilots—in the backs of our minds are constantly tuned to a proper synchronized engine sound, and when it's not there, or absent altogether, we suddenly become aware of it. Suddenly, aboard this aircraft, there was total silence. I was instantly awake as the C-97 began a precipitous imitation of a falling brick. Shoes and boots began bouncing off the overhead in wild disarray. Everyone in a litter slammed upward, crashing into the litter directly above. As the aircraft headed directly for the Pacific, one engine finally caught and restarted followed quickly by the other three. Anyone care to guess the cause? The crew forgot to switch fuel tanks. Fortunately for us, a midair engine start was achieved. There were a number of bumps and bruises and bloody noses. By the time we got 40 or so boots and shoes sorted out, we were so wired that additional sleep was impossible. That aircraft had the glide ratio of a rock.

BUMED Archives

A flight nurse in training places a Mae West life vest on a litter patient.

Later when I was assigned to the Navy's VR-2 squadron, the aircraft I really liked was the Martin Mars, the huge JRM flying boats operating between John Rogers Naval Air Station, adjacent to Hickam Air Force Base in Hawaii and Alameda Naval Air Station in California. A Mars could carry three times as many Korean ambulatory patients as any existing aircraft. Flight time west to east was about 12 to 14 hours at about 170 miles an hour. The JRM Mars flying boats airlifted ambulatory Korean War casualties. Nursing duties were minimal aboard these flights, i.e. administering medications and inspections, some dressing changes, and assisting patients using crutches.

The Mars was special and unique. Its wingspan was 200 feet and the fuselage was 120 feet long. The wing root, where it joined the fuselage, was so large that I could stand fully erect and walk out into the interior of the wing. All four engines could be accessed and serviced from within the wing structure. I flew aboard the Caroline Mars. There were four others plus the prototype. ❑

LCDR Hovis would go on to become the first Navy nurse to volunteer for duty in Vietnam. ("Coup in Saigon: A Nurse Remembers,"*Navy Medicine*, Nov-Dec 1997). She is the author of *Station Hospital Saigon: A Navy Nurse in Vietnam, 1963-1964.* LCDR Hovis resides in Annapolis, MD.

The Effects of Weightlessness on Mental Performance and Cognitive Function

LT Joseph E. Ollivier, MSC, USNR

Mankind's expeditions into space have taught us that human physiology is intrinsically adapted to the gravity of our earth. In fact, most, if not all systems of the human body, are affected by the pull of gravity. As has been shown by previous spaceflight research, the effects of weightlessness is known to cause increased loss in bone mass, muscle atrophy, and loss of intra-vascular fluids.(*1*) Our immune systems are altered in ways that make it uncertain as to what the long-term effects of weightlessness will have on an astronaut's ability to combat pathogens and malignancies.(*2*)

All these systems are important but probably the most important question will be how microgravity affects our thought processes and perception of our surrounding environment. Although we rarely contemplate it, the human brain is actually just another organ that requires biochemical and neurochemical pathways to perform simple and complex functions. The brain, and the nervous system it is connected to, is the major communication network in the human body. As with other animals, normal bodily functions, including mental performance and cognitive function, are intrinsically dependent on the maintenance of the structural integrity and metabolic processes performed in the brain and nervous system under the influence of gravity.

Some of the functions of our nervous system are autonomic and are performed without our consciously thinking of them, such as sensory perception of hot and cold, dull and sharp, and up and down. During prolonged space flight astronauts are exposed to several other external

stressors besides gravity. Such changes as altered dark-light cycle, elevated carbon dioxide concentrations in the compartments, and the high mental and physical workload demanded of the astronauts all may contribute to how they perform mentally.

We know that exposure to weightlessness affects our control and orientation of the body position. When humans are in weightlessness the perceptions of one's own orientation and surroundings is dependent on contact cues, the internal surroundings of the spacecraft, our cognitive function and previous exposure history. In weightlessness the sense of falling is not felt, even if the eyes are shut or our visual fields are stabilized. This all points to evidence that visual and cognitive factors are involved in compensating. Limbs that do not have gravity pulling down on them have a degraded sense of position.(*3*)

One of the more important senses that we seem to overlook is that of tactile sensation, which is how an individual perceives objects and structures through touch. In blind individuals this sense is enhanced. With astronauts it appears that the perception of the orientation of complex tactile stimulation such as letters and numbers is not affected by the absence of gravity. Although we do not appreciate the sense of touch compared to sight and sound, in the event of an emergency where an astronaut may have to navigate through the compartments of a space station by touch, they would still be able to do so in a weightless environment, and recognize the instruments they come in contact with.(*4*)

Another uncertainty posed is that of the problem of orientation in form perception in a weightless environment. In other words, how much does gravity play a role in recognizing objects in microgravity when their spatial orientation is skewed by weightlessness. As terrestrial creatures that have evolved in a gravitational force field, some researchers have hypothesized that a gravitational reference frame may have evolved internally and is utilized by the brain's subsystems. The two main factors that participate in form perception are retinal orientation of form and assignment of dominant direction (up, down, sides) to a form. From all studies to date it appears that visual recognition in a weightless environment remains relatively intact despite alterations experienced by the central nervous system. Overall astronaut recognition is not seriously affected by the unique environment of weightlessness. Some astronauts have reported increased ability in recognizing disoriented objects and faces in a weightless environment but current studies have not as yet been able to support this.(*5*)

Invariably, individuals do not realize the role that gravity provides as a reference frame in estimating body movements. Gravitational pull of the earth can essentially be considered a force acting on both our vestibular and proprioceptive systems. The representation and efficient interaction of these systems in coordinating movements of our extremities would be impossible if the CNS was unable to have a reference frame from which external objects, in terms of their position and displacement, could be estimated in relation to the whole body. Probably the best representation of the loss of reference is when input systems such as the vestibular or proprioceptive systems have become impaired causing signals to become distorted or disrupted.

If individuals develop any number of inner ear disorders such as labyrinthitis, Meniere's syndrome, or vestibulopathy, they can experience vertigo, which may give the sensation of spinning, but also of tumbling or falling forward or backward. Individuals who close their eyes while standing, with arms straight out in front of them, normally can maintain their position, but with disease or lesions of the cerebral cortex, individuals may develop cerebral ataxia, causing them to drift or fall without sensing the movement. Remarkably, under normal circumstances, in a microgravity environment, these systems tend to still function optimally.(*6*)

Probably the most important aspect of living and working in space will be how well humans perform mentally. How will the human brain actually tolerate a weightless environment? Initially, the body loses as much as 2 liters of intravascular fluid while in a weightless environment. There may actually be a mild to moderate amount of cerebral swelling secondary to this fluid loss with a lag period until the body can equilibrate it through the blood-brain barrier. Does this have any effect on synaptic transmission and response time?

There are numerous chemical neurotransmitters in the brain. Neurotransmitters are actually those chemicals secreted at the junction of nerves that allow signals to travel from one portion of the brain to another. Biogenic amine transmitters such as norepinephrine, epinephrine, serotonin, and histamine are critical for the cognitive function and mental performance of the human brain. Neurotransmitters (amines), hormones (proteins and peptides), and steroids all allow for maintenance and function of the human body and brain. Neurotransmitters allow for the movement of all muscles thoughout the human body, including musculoskeletal muscle, smooth muscle, and the muscle of the heart.

Hormones such as insulin allow for the uptake of glucose into the cells of the brain. Previous space flight research indicates there is some glucose intolerance in a weightless environment. Scientists will want to know whether this is due to the insulin receptor on the tissues or an alteration in the insulin protein. The neurotransmitter norepinephrine has been shown in animal studies to be reduced in microgravity.(*7*) Norepinephrine is a primary transmitter for postganglionic sympathetic neurons. Chromaffin cells in the adrenal medulla add a methyl group to norepinephrine to produce the hormone epinephrine. Dopamine, which is the precursor to norepinephrine, is critical in the function of the substantia nigra and corpus striatum which are associated nuclei of the basal ganglia. This area of the brain contributes to fine motor movement that has been calibrated to an earth bound environment. Diseases of this portion of the brain are seen in such conditions as Parkinson's and Huntington's disease. Serotonin (5-hydroxytryptamine) is a neurotransmitter seen in high concentrations in certain nuclei of the brainstem. Serotonergic neurons are suspected of being involved in temperature regulation, control of mood, sensory perception, and the onset of sleep. Numerous anti-depression medications have their focus as being serotonin reuptake inhibitors. In other words, low serotonin may contribute to episodes of depression. Will individuals at risk for low grade depression actually manifest mood alterations or develop some degree insomnia in space if serotonin levels are altered over time? Another neurotransmitter, aminobutyric acid (GABA), is probably the most common neurotransmitter in the brain and acts as an inhibitory transmitter or regulating the rate of signal transduction.(*8*) The receptors that GABA act on are actually the focus of general anesthetics in that allowing these GABA chloride channels to remain open longer will prolong the inhibition of post synaptic neurons blocking pain sensation. In fact, even though we have focused on the chemical neurotransmitters themselves, there is no clear understanding what effect long-term weightlessness will have on the receptors these chemicals act on.(*9*) This focus of space research will be particularly exciting in that there may be new insights into brain function which will allow us to understand and hopefully discover new treatments or even cures for certain central nervous system disorders such as Parkinson's disease, cerebral palsy and a whole host of other disorders affecting the brain. The study of protein and peptide synthesis and structural design in a weightless environment will be a unique opportunity. This type of research will delete a previously mandated component of protein evolution and structure, namely gravity, which may give scientists opportunities to manipulate and manufacture proteins and amine design in ways that cannot be accomplished in a gravitational field. This may very well be the first step in a new revolution in medicine and drug therapy.

Clearly the brain is a complex organ dependent on the biochemical synthesis and balance of chemical mediators. Will prolonged weightlessness encourage the brain to recalibrate its biochemical processes to meet its new environment? As we have seen so far humans have been able to cope very well in a weightless environment. Safety and performance of activities inside and outside spacecraft has been documented. Now that the international space station is being permanently manned research will continue in an environment that will eventually become a new habitat for humanity.

References

1. Ollivier JE. Challenges of spaceflight on human physiology, *Navy Medicine.* Jan-Feb 1998.
2. Ollivier JE. Space sickness: the effects of weightlessness on the human immune system, *Navy Medicine.* Mar-April 2000.
3. Manzey D, Lorenz B. Mental performance during short-term and long-term spaceflight. *Brain Research Reviews.* 1998;28: 215-221.
4. Gurfinkel VS, Lestienne F, Levik YuS, Popov KE. Egocentric references and human spatial orientation in microgravity. I. perception of complex tactile stimuli. *Experimental Brain Research.* 1993;95(2): 339-42.
5. Leone G. The effects of gravity on human recognition of disorientated objects. *Brain Research Reviews. 1998;* 28:203 - 214.
6. Pozzo T, Papaxanthis C, Stapely P, Berthoz A. The sensorimotor and cognitive integration of gravity. *Brain Research Review.* 1998; 28: 92-101.
7. Sothman M, Kastello GK. Simulated weightlessness to induce chronic hypoactivity of brain norepinephrine for exercise and stress studies. *Medicine & Science in Sports and Exercise.* Jan 1997 (42 ref);29 (1):39-44.
8. Berne RM, Levy MN. *Physiology*, 4th edition, Mosby Publications, Copyright 1998.
9. Miller JD, McMillen BA, Murakami DM, McConnaughey MM, Williams, Fuller CA. Effects of weightlessness on neurotransmitter receptors in selected brain. *Physiologist.* 1985 Dec; 28 (6 Suppl): 203-4. ❑

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IN MEMORIAM

WINNIE GIBSON PALMER DEWITT:
Seventh Director of the Nurse Corps

CAPT Patricia M. Collins, NC, USNR

CAPT Winnie Gibson's life, 15 December 1902-21 July 2000, spanned the creation of the Navy Nurse Corps, two world wars, and the commissioning of nurses as officers in the Navy. Following graduation from Seton Infirmary in Austin, TX, Gibson worked in various nursing settings prior to her appointment in the Navy Nurse Corps on 4 April 1930. Her desire for adventure, travel, and educational opportunities drew her to the Navy. Following a tour at Naval Hospital Philadelphia, her love of surgical nursing led to her completion of a 6-month program in anesthesia at the School of Nursing, Graduate School of Medicine at the University of Pennsylvania. Gibson then served as operating room supervisor and anesthetist at Naval Hospitals New York, Quantico, Mare Island, and Pearl Harbor. She also had a 16-month tour aboard the 500-bed *Relief*, (AH-1) which served the Pacific Fleet.

Early in her career, there were no specialty training schools for hospital corpsmen. "There's just nobody like the Navy corpsmen. We trained them and supervised them. Teaching was always a big part of Navy nursing. I just loved all those corpsmen." Compared with civilian nursing, Gibson noted the Navy's emphasis on education. "The Navy was always encouraging you to advance yourself."

A Pearl Harbor survivor, Gibson was in the operating room on Sunday, 7 December 1941. At that time, they worked every day of the week. She recalled the extraordinary teamwork with everyone working well together to deal with the massive number and severity of casualties.

Gibson served as a chief nurse at Naval Hospitals Jacksonville, Annapolis, and Houston. "I loved every assignment" but Quantico was special. That's where I met my first husband, Horace Palmer. He was a Marine Corps officer and he was the love of my life." (They married and lived in Ohio after they had both retired in 1954.) Following Horace Palmer's death in 1979, Gibson subsequently married Horace DeWitt in 1983 and lived in Hornell, NY, until his death in 1989. She then moved to Houston and lived with her niece until 7 years ago when she joined her twin brother Wayne in a Prescott, AR, nursing home.

According to Gibson, the greatest change during her 24-year career was the enactment of the Women's Armed Services Integration Act that authorized Navy nurses as naval officers. Just 1 month after assuming her position as Director, Navy Nurse Corps, North Korean forces violated the 38th Parallel. Following the deployment of air, naval, and ground forces in June 1950, reserve nurses were involuntarily recalled for the first time to care for Korean War casualties. Due to the overall demobilization following World War II, there were only 1,510 regular and 440 reserve Navy nurses on active duty assigned to 26 naval hospitals, 67 station hospital, and dispensaries worldwide, 3 Hospital Corps schools, 2 hospital ships, and 8 Military Sea Transport service ships. At one point Gibson told her BUMED staff that the Secretary of Defense had ordered her to recall 125 nurses a week until further notice. On 25 August 1950, 15 Navy nurses aboard the *Benevolence* (AH-13) survived a collision at sea, and abandoned ship just before she sank. One of the nurses died shortly after she was picked up by an Army tug. On 19 September 1950, 11 recalled Navy nurses aboard a military transport plane perished when the plane crashed during a takeoff from a stopover on one of the Marshall Islands. For weeks, personal effects of those nurses washed ashore and were sent to BUMED for return to the families of the deceased nurses. This was particularly stressful for CAPT Gibson.

By 1951, the national nursing shortage was even more pronounced in part due to the low birth rate of the depression years. Nursing end-strength peaked at 3,328 nurses on 1 July 1951. In just 2 1/2 years of the Korean War, over 54,000 Americans died and there were 140,000 casualties. CAPT Gibson described her greatest achievement during her term as Director of the Navy Nurse Corps from 1 May 1950-1 May 1954 as: "promoting the increases in ranks of the nurses in the Nurse Corps."

Nurses who served with her described her as "delightful," "a real lady," "the greatest as a military leader," "the best chief nurse I ever had," and "everyone loved Winnie Gibson." She was known for her personal acts of kindness toward other nurses. In an interview several years ago, she gave an indication of her empowering spirit: "If you see something that needs to be changed, don't be afraid to change it. Don't rely so much on the senior officers to do everything. Consult with your seniors and work with them to make the place better and be fair to everyone."

Among Gibson's military decorations were the Unit Commendation Ribbon, American Defense Service Medal with Base Clasp, Asiatic-Pacific Campaign Medal, and World War II Victory Medal. ❑

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Book Review

Hospital Ships of World War II: An Illustrated Reference by Emory A. Massman. McFarland and Company Inc., Jefferson, NC. 499 pages, 1999

In his book, *Hospital Ships of World War II: An Illustrated Reference*, Emory A. Massman documents the colorful and sometimes convoluted history behind the 39 hospital ships that sailed in harm's way in support of our armed forces during World War II. Since most would assume that these ships were the sole property of the U.S. Navy, they will undoubtedly be surprised to learn that far more of these ships were, in fact, Army ships. Mr. Massman provides a very thorough explanation of each ship's pre-conversion history, hospital ship activities and missions, and ultimate fate.

This book provides a fascinating introductory lesson in the background of early hospital ships, including the possibility that such ships may have been used as early as 431 B.C. The use of hospital ships in this country originated during the Civil War. Early in the war, these ships were operated not by the Army or Navy, but by several components of the U.S. Sanitary Commission. While that organization was ultimately responsible to the War Department at that time, it was also more adept than War Department officials at cutting through the bureaucracy sometimes encountered by the ships' crews.

In addition to these Sanitary Commission hospital ships, several states also had ships of their own. These state-owned ships, however, were only for sick or injured military personnel from that specific state. Later in the Civil War, the Navy and Army acquired riverboats, which were converted and operated as hospital ships.

Doubtless the most famous of all riverboat hospital steamers was the Navy's first, *Red Rover*. Later, throughout the Spanish-American War and World War I, hospital ships continued to play a pivotal role in the evacuation, care, and transport of the sick and injured.

Throughout World War II, assorted ship configurations were converted to serve as hospital ships. Among these were transoceanic passenger liners, coastal passenger vessels, freighters, liberty ships, and troop ships. In fact, the only vessel designed and built as a hospital ship from the keel up was the Navy's USS *Relief* (AH-1).

This book provides a multitude of information on ship design and re-design, crew complement, missions, and even ship's menus. It also chronicles the many hazards, exploits, and accomplishments of countless men and women during World War II. Each chapter includes pictures of the ship, crew, and patients, as well as photographs and descriptions of patient populations complete with the types of injuries and illnesses treated onboard. These photographs easily demonstrate the challenges inherent in caring for patients with extensive wounds in close quarters.

Among the most interesting aspects of this book are the personal accounts from patients and crew, and excerpts of letters they sent to their loved ones back home. They easily convey to the reader with the depth of emotion felt at times by the crew, and the depth of gratitude felt by their patients. Most striking throughout this book was the message that these ships not only served as transport to many injured Soldiers and Sailors, but were also viewed by these patients as a safe haven, away from the rigors of war.

While this was true in many cases, many hospital ships were fired upon with lives lost, including one incident on 28 April 1945 when a Japanese kamikaze plane attacked USS *Comfort* (AH-6) off the coast of Okinawa. In addition to extensive damage to the ship, this attack resulted in the deaths of six doctors, six nurses, nine Army medics, one navy crewman, and seven patients. In addition, 38 Army and Navy enlisted personnel were injured. Fittingly, this book is dedicated to the 29 men and women who lost their lives.

A seasoned mariner in his own right, Mr. Massman captures and effectively drives home the character of each ship, their differences and their similarities, in a manner that allows the reader to gain a small but clear picture in his mind's eye of the rigors and small joys of daily shipboard life. Well-researched and informative, this is more than just a text of military and maritime history. It is a must read for anyone interested in the roots of military medicine, the hospital ship program, or those who simply desire to catch a glimpse of the trials and triumphs of those courageous men and women who have gone before those who now serve.

—CDR Maureen J. Zeller, NC, USN, served onboard USNS *Mercy* (T-AH 19) as a perioperative nurse during the Persian Gulf War and is now stationed at Naval Hospital Great Lakes, IL.

Navy Medicine 1952

Air Force, Army, and Navy personnel prepare an iron lung patient for a medevac from Tripler Army Hospital, HI, to Naval Hospital Great Lakes, IL. ENS Virgnia Pluke, NC, USN, of the 1453 Medical Air Evac Squadron speaks to the patient.

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